

WHAT IS CLAIMED IS:

5 1. A test module for optically measuring color and intensity of light emitted from light-emitting devices comprising:

----- ~~at least one sensor having photodetectors to filter color~~
portions of the light from the light-emitting devices, the
10 sensor producing a sensor signal; and

 electronics for receiving and conditioning the sensor signal to produce wavelength and intensity output signals.

 2. The test module of claim 1 wherein there are a
15 plurality of sensors and each sensor has three photodetectors individually filtered to pass red, green, and blue portions of visible light.

 3. The test module of claim 1 wherein the electronics
20 include a microcontroller programmed to use a combination of all color component values to determine intensity and ratios of individual color values to algorithmically match a monochromatic input color to wavelength based on CIE color matching values.

25 4. The test module of claim 2 further comprising fiber optic cables positioned between the light-emitting devices under test and the sensors.

30 5. The test module of claim 4 wherein at least a portion of the fiber optic cable is positioned in a tube which is rigidly mounted in the test module adjacent the light-emitting devices under test.

35

6. The test module of claim 2 wherein the sensors are positioned under a light shield.

5 7. The test module of claim 1 wherein the electronics further include amplifiers and an analog multiplexer.

8. A color and intensity test module for automated test equipment comprising:

10 a sensor assembly capable of detecting color content of light emitted from a unit under test;

15 means for processing the color content to calculate intensity and wavelength data of the light emitted from the unit under test; and

an output interface to present the intensity and wavelength data to the automated test equipment in digital or analog form.

20 9. The test module of claim 8 wherein the sensor assembly are mounted remotely at the unit under test and electrically connected to the means for processing.

25 10. The test module of claim 8 wherein the sensor assembly includes fiber optic cables used to collect light signals from the unit under test and transmit the light signals to the sensor assembly.

30 11. The test module of claim 8 wherein the means for processing uses a predefined set of color ratios based on standard color matching tables to determine wavelength by comparing the color ratios of the light emitted by the unit under test.

12. The test module of claim 8 wherein the means for
processing calculates wavelength based on a proportion of the
5 red, green, and blue content of the light detected for a
monochromatic emitting device.

13. The test module of claim 8 wherein the means for
processing determines a white source from a unit under test
10 when all color sensor levels contribute equally to a total
input.

14. The test module of claim 8 wherein the means for
processing further converts an input light to an analog signal
15 scaled directly from nanometers to millivolts or a multiple
thereof throughout a visible spectrum of 380nm to 700nm.

15. A method to test color and intensity of a light-
emitting device comprising the steps of
20 detecting light from the light-emitting device by a
three-color sensor;
 filtering the light into levels of red, green, and
blue;
 conditioning the red, green, and blue levels;
25 converting the levels into digital values;
 generating an analog wavelength value linearly
scaled to the visible spectrum;
 generating an intensity value linearly representing
luminous intensity; and
30 reading the wavelength value and the intensity value
and comparing the values against expected values.

16. The method of claim 15 wherein the step of comparing
uses a predefined set of color ratios based on standard color
35

1 **51094/GSL/E87**

 matching tables to determine wavelength by comparing the color
 ratios of the detected light irrespective of an absolute
5 value.

 17. The method of claim 15 wherein the step of
 generating a wavelength value provides a calculated wavelength
 output, based on a proportion of the red, green, and blue
10 colors detected by a monochromatic emitting device.

 18. The method of claim 15 wherein the step of
 converting converts the detected light to an analog signal
 scaled directly from nanometers to millivolts or a multiple
15 thereof through a visible spectrum of 380nm to 700nm.

 19. The method of claim 15 wherein the steps of
 conditioning and filtering condition and filter the compliment
 colors of red, green and blue.
20

25

30

35